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3-25-4

AP/3752

THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND
INTERFERENCES

In re Application of:)
Barrera et al.) GROUP ART UNIT: 3752
Serial No.: 09/675,860)
Filed: September, 29, 2000) EXAMINER: Christopher S. Kim
For: APPARATUS AND METHOD OF)
EFFECTIVE FLUID INJECTION)
AND VAPORIZATION FOR)
CHEMICAL VAPOR)
DEPOSITION APPLICATION)

)

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APPELLANTS' REPLY BRIEF

In the Examiner's answer mailed January 27, 2004, the Examiner raised certain points of argument to which appellants respectfully submit this reply. This reply brief is being filed in triplicate pursuant to 37 C.F.R. § 1.193(b).

1. Status of Amendments After Final

The Appellants' Amendment After Final Rejection has not been entered. Appellants had incorrectly stated that this amendment was entered. The Examiner has treated this amendment as a "request for reconsideration," and thus, did not enter it.

2. Grouping of Claims

Appellants acknowledge the Examiner's statement regarding the grouping of the claims and restate the grouping as follows:

Claims 1-10 and 12 stand or fall together.

Claims 13-17, 19-21 and 27 stand or fall together.

Claim 26 stands alone.

Claims 28, 29 and 30 stand or fall together.

3. Response to Examiner's Arguments

35 U.S.C. § 102 Issues

The Examiner has rejected claims 1, 3-5, 7-10, 13, 15-17, 19-21 and 26-30 under 35 U.S.C. § 102(b) as being anticipated by Gwyn, U.S. Patent No. 4,397,422. Appellants respectfully disagree. The Examiner states that Gwyn discloses a "chemical vapor deposition chamber" in similar fashion as the claimed invention. The Examiner cites a venturi mixer 18 as the chemical deposition chamber. However, those of ordinary skill in the chemical vapor deposition art would not refer to a mixer as a deposition chamber. Indeed, no deposition is performed in the mixer at all. The "deposition" of Gwyn's paint happens at the exit end of the paint gun, not within a chamber.

In the semiconductor arts, deposition occurs within the chamber but outside the cavity. As noted in the specification, a deposition problem addressed by the present invention included pre-mixing the liquids prior to their introduction into the chamber:

As a result of pre-mixing liquids prior to their introduction into the chamber, minor pressure fluctuations in any of the multiple liquid flow supplies will cause the dopant flow rate to fluctuate. Since the dopant

flow levels are much lower than the TEOS flow rates, minor changes in the TEOS flow will cause large changes in the dopant flow.
Specification, p.3, ll.16-20.

In claim 1, the chemical vapor deposition chamber is positively cited. Moreover, the chamber is cited as having a cavity, which comprises an inlet nozzle, throat region, and an exit nozzle. Contrary to the Examiner's assertion that the "chamber" is the intended use of the "apparatus" for "delivering a plurality of chemical vapor deposition fluids" (Examiner's Answer, p.8), the chamber is positively cited as part of the apparatus. The Examiner further states that the "cavity in turn makes up the chemical vapor deposition chamber." This is not true. The chamber is defined as *having* a cavity, not totally encompassed by a cavity. The cavity *comprises* an inlet nozzle, a throat region, and an exit nozzle. It is the cavity that has these elements, not the whole chamber. If the Examiner's interpretation is accepted, the nozzles, throat region, cavity, and chamber are all one in the same, which is how the Gwyn patent would have to be incorrectly interpreted to read on the present invention. This would imply that the deposition occurs in the space reserved for mixing the dopants. The present invention does not teach this, nor would the Examiner's interpretation allow for the proper application of deposition layers on semiconductor substrates.

Claims 13 and 30 state that the exit nozzle is an extension of the throat region, consisting of the same dimensions (diameter) as the throat region. Claim 13, ll.22-26; Claim 30, ll.2-4; Specification, p.10, ll.27-29; Fig. 6. Since Gwyn does not teach or disclose this structural limitation, it simply cannot anticipate. To constitute

anticipation, all material elements of a claim must be found in one prior art source. In re Marshall, 577 F.2d 301, 198 U.S.P.Q. 334 (C.C.P.A. 1978).

Claims 3 and 15 require the throat region to be configured to operate at a critical mach number of 1. The specification teaches the conditions for this configuration:

The initial pressure at the inlet, P_1 , is related to the pressure at the throat, P_2 , as follows:

$$P_1/P_2 = [1 + (1/2)(k-1)M_a^2]^{k/(k-1)} \quad (2)$$

where,

M_a is the Mach number;

P_1 is the stagnant pressure; and,

P_2 is the throat pressure.

This equation is generally used to determine the gas velocity and gas properties within the expansion nozzle.

For a Mach number equal to 1, equation (2) may be simplified to the following:

$$P_2/P_1 = [2/(k+1)]^{k/(k-1)} \quad (3)$$

Specification, p.11, ll.17-28.

Gwyn does not teach or disclose any such configuration conditions. Consequently, Gwyn cannot support a throat region configuration for a mach number equal to 1. The analytical conditions delineated within the specification for a mach number equal to 1 must be satisfied. The specification teaches this, and claims 3 and 15 require this analytical satisfaction. Gwyn is silent regarding any teaching of this configuration, and thus, cannot anticipate.

35 U.S.C. § 103 Issues

The Examiner has rejected claims 2, 12 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Gwyn. The Examiner states that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided an angle of forty to sixty degrees for optimization dependent of the

application criteria. Appellants respectfully disagree. Clearly, Gwyn does not teach or disclose any such optimization. Nor is such optimization *inherent* in Gwyn. There is no basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic (optimization at different angle configurations) necessarily flows from the teachings of the prior art. In Ex parte Levy, 17 U.S.P.Q.2d 1461 (B.P.A.I. 1990). Inherency must be a necessary result and not merely a possible result. In re Erich, 212 USPQ 323 (C.C.P.A. 1981).

Furthermore, those skilled in the semiconductor arts would not experiment with the optimum or workable ranges for chemical vapor deposition of semiconductor substrates using the paint gun of the Gwyn patent, since this non-analogous art does not lend itself to semiconductor application. As noted above, there is no deposition chamber as is normally used in the chemical deposition of semiconductor substrates. The Examiner's interpretation relies on deposition occurring in the mixing cavity. Those skilled in the semiconductor arts would not perform chemical vapor deposition in a mixing chamber, and thus would not consider this application relevant. Therefore, optimization to applications in the semiconductor arts would not have been obvious.

3. Conclusion

It is submitted that Appellants' main brief addressed all of the relevant issues raised by the Examiner in his final rejection, and the arguments put forth by the Examiner in his answer do not support a rejection of the Appellants' claims, for the reasons previously set forth in the Appellants' main brief and those delineated herein.

For the foregoing reasons stated in the Brief for Appellants and those herein, it
is respectfully requested that this Board overrule the Examiner's rejection.

Respectfully Submitted,



Robert Curcio
Reg. No. 44,638

A handwritten signature in black ink, appearing to read "R. Curcio".

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Name: Marian R. Capelli Signature: Marian R. Capelli
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